

UNIVERSITY OF CALIFORNIA.

AGRICULTURAL EXPERIMENT STATION.

BULLETIN NO. 68.

University Distribution of Seeds, Plants, etc.

The books of record of the distribution of seeds, plants, cuttings and scions, for the year 1887 were closed on April 1st. A review of the summary prepared by the clerk in charge of the distribution, reveals some facts which may be of general interest as showing the extent of this branch of the University's work, and the popular interest taken in it.

Bulletins 61 and 62, describing the material offered for trial, were issued the first week in January. The announcement was given wide circulation by the newspapers of the State, and it soon became apparent that the demand for some kinds of seeds and plants was far greater than the stock which we had been able to propagate. This fact shows the wide interest taken in local experimental work in this State, and encourages us to efforts for larger supplies for future offerings. It is, of course, not easy to secure always enough material, because it is designed to distribute only novelties which are not yet in the hands of the nurserymen and seedsmen. For example, two varieties of olives obtained through Mr. Pohndorff's importation were multiplied as far as the wood available for small cuttings would go, and yet the stock secured was not enough to fill half the orders which came in for them. It was much the same with the new varieties of guavas.

In the seed distribution most interest pertains to grasses and forage plants. The improvement of our pastures and meadows is one of the most important problems in California agriculture. The substitution of perennial grasses for the annuals which are running out so fast under close pasturing, the discovery of suitable forage plants for situations where alfalfa does not yield satisfactory results, are matters to which the people generally are wide awake, and our correspondence shows that the University distribution has already placed in the hands of the growers several plants which will serve an important purpose in ministering to these needs.

The tabulated statement below shows that the orders for forage plant seed was several times greater than for other kinds of seed, and though a large distribution was made, there was over 20 per cent of the orders unfilled because of lack of material. In all cases orders are entered according to the dates, and those first received are first filled.

The offering of seeds and plants by the College of Agriculture involves a plainly expressed obligation, which is assumed by the applicant, that the results of the experiment will be communicated to us, in order that a wide area of

local experimentation may be in our view, as we endeavor to decide upon the adaptation of any industrial growth to the conditions in this State. We are glad to acknowledge that this obligation is being well discharged by a large proportion of those to whom we have sent materials for experiment. Our report for 1886, which was transmitted to the State printer last December, but which, unfortunately, has not yet been published, will show how active an interest there is in experimentation, how gratifying a disposition to communicate results, and how important are the facts that have been disclosed by local experiments. Of course, as the distribution widens and as larger numbers of voluntary observers are enlisted, still more interesting and important results may be expected.

Summary of Distribution of 1887.

KIND OF PLANT OR SEED.	AMT. DISTRIBUTED.
Hessian-Fly proof Wheats:	
Volo.....(lbs.)	20
Misscocy....."	21
Atlanti....."	22
Textiles:	
Ramie.....(plants)	270
Esparto Grass.....(plants)	70
New Zealand Flax— <i>Phormium tenax</i>"	380
Flax:	
White Flowering from France.....(lbs.)	15
Royal from Germany....."	14
Russian from Pskoff....."	14
Yellow Seeded....."	15
Grasses and Forage Plants:	
Schrader's Brome— <i>Bromus unioloides</i> (pkgs.)	142
Millet Grass— <i>Milium multiflorum</i>"	63
Japan Clover— <i>Lespedeza striata</i>"	86
Trees and Plants:	
Kikar or Gum Arabic— <i>Acacia Arabica</i> (trees)	205
Black Wattle— <i>Acacia decurrens</i>"	185
Black Wattle—Packages of Seed....."	42
Olives—Manzanillo and Nevadillo....."	224
Guavas— <i>Psidium pomiferum</i> , <i>Cattleyanum</i> and <i>aromaticum</i>"	201
Insect Powder Plants:	
<i>Pyrethrum roseum</i>(pkgs.)	34
<i>Pyrethrum cinerariaefolium</i>"	80
Miscellaneous:	
Bamboo— <i>Arundinaria falcata</i>(plants)	78
Quinoa— <i>Chenopodium quinoa</i> —Seeds..(pkgs.)	40
Kaffir Corn....."	61
Cuttings and Scions:	
Apricots.....(bundles)	175
Apples....."	204
Crab Apples....."	79
Pears....."	220
Plums....."	313
Mulberries....."	193
Vines, Naive American....."	82
Vines, Aititic....."	42
Vines, Huasco Raisin Grape....."	139

As the bundles of cuttings and scions average about ten sticks each, there were about 15,000 sent out in the course of the distribution. The demand for named scions of standard fruits is evidently large and the University orchard is serving a most important use.

In many cases the scions have been ordered for grafting in orchards to identify varieties of which the names have been lost, and in this way an opportunity for local comparison of fruits, grown under precisely the same conditions, is secured. In other cases the scions have been sent for to work over many of the old seedling trees planted in early days when seeds were used in place of young grafted trees which were not then available.

The distribution of New Zealand flax included a lot sent for planting in a large vineyard in Fresno county, where, if the plant thrives, the leaves will be used in tying vines. In the coast valleys it has been shown to grow well, and its use for vine-tying, and for other similar purposes, promises to be large.

The records show that in all, 631 orders were received, and material was sent into nearly all the counties of California. Packages were sent to 197 express and 429 post offices. The total receipts from applicants were \$291.70, which was expended as follows: Packing material, etc., \$54.13; wages, \$90.25; expressage and postage, \$85.27; money returned (to those who sent in excess of requirements), \$61.99. Total, \$291.64. This close balance of receipts and expenditures shows that the charges were well gauged to meet the cost of the act of distribution; and the charge has been of advantage in preventing idle application for what could be had for nothing, and has brought the material into the hands of those who really desired to experiment with it. Of course the expense of propagation of the seeds and plants is borne by the general funds of the College of Agriculture; applicants are only charged the bare cost of packing and transmission.

It may be remarked that this showing indicates the work that has been done in the way of promoting local experimentation in advance of the provision for such effort by the United States, in the Experiment Station law which was passed at the last session. It is expected that when increased funds become available under that law, this work will be proportionally advanced, as it is contemplated that each station shall constitute an additional center of distribution.

E. J. WICKSON.

Berkeley, April 15 1887.

Influence of the Mode of Fermentation on the Color of Wines.

It will be remembered that toward the end of the vintage season of 1886, a series of nine fermentations, intended to test the influence of various methods of fermentation upon the resulting wines, was made at the viticultural laboratory; the material being second crop Zinfandel grapes furnished by Mr. Gallegos, of Mission San Jose. The first results of these

experiments were given in Bulletin No. 63, and more extendedly in the Viticultural Report for 1886, pages 116 to 124. As time progresses the differences between the several products becomes in some cases much more marked than they were at first; among these the color-changes are especially notable and practically instructive.

The table below shows the intensities and tints observed by means of the colorimeter at three different times, the first being immediately after pressing, the date of which was between November 7th and 15th.

Mode of Fermentation.	Percent of Color at Pressing		Percent of Color Dec. 20, 1886.		Percent of Color April 8, 1887.	
		Tint.		Tint.		Tint.
556 Foulage and floating cover...	43.4	2d p.r.	36.3	2d p.r.	17.0	4th p.r.
557 Foulage, no cover.....	31.8	2d p.r.	31.8	2d p.r.	14.0	1 to 2 r.
558 Three Perret's frames.....	30.0	2d p.r.	18.8	3-4 p.r.	7.4	2d r.
559 Single Perret frame.....	27.8	2d p.r.	18.0	3d p.r.	9.0	1st r.
560 Frequent foulage, no cover...	46.4	2d p.r.	35.7	2d p.r.	18.0	4 to 5 p.r.
561 Foulage and floating cover...	47.0	2d p.r.	27.0	4th p.r.	20.6	3 1/2 p.r.
563 Morel process, with s.cens...	47.6	2d p.r.	30.0	2d p.r.	17.7	5th p.r.
564 Old style, no cover or stirring...	40.6	2d p.r.	30.0	3d p.r.	17.0	4th p.r.
562 Foulage and floating cover—Temp. 62°.....	34.5	3d p.r.	30.0	3d p.r.	17.0	4th p.r.

NOTE.—"p. r." means purple red; "r." means red.

It will be noted that of the nine wines, five had at pressing a full amount of color, averaging about 46 per cent of the (assumed) maximum of the scale; while the four others had in the neighborhood of 30 per cent only, the lowest being in the case of the sample fermented with one grated frame (No. 559) that kept the pomace submerged in one mass, but was not stirred at all during the fermentation. The next

lowest was the one in which three frames were used (No. 558); the next to this the one fermented at 100 degrees without cover (No. 557) but with frequent stirring; the next, the one treated in by our usual method, with solid floating cover and twice-daily stirring, but at 62 degrees (No. 562) instead of the usual temperature of 75°; while the one similarly treated at the latter temperature (No. 561) had the maximum of 47 per cent of color. The influence of a high temperature in securing a rapid and full extraction of color was further shown in the sample similarly fermented at 100 degrees (No. 556), in which 46 hours sufficed to extract the color fully. A comparison of the samples treated without stirring with those in which stirring was practiced, leaves no doubt of the beneficial influence of "*fouillage*."

In the readings of Dec. 20, however, the differences originally brought about by difference in the temperature of fermentation are already greatly diminished. Nos. 556, 561 and 562, which were fermented respectively at 100, 75 and 62 degrees, now show a difference of only 6 between the two first on the one hand and the third on the other. On April 8th these three samples have become exactly alike, both in intensity (17) and in tint.

It thus appears that the apparent advantage of a high temperature in fermentation, in extracting the color, was only a temporary one, and has ceased to manifest itself just about the time that new wines are usually sold. The little color of the wine made at 62 has maintained itself, having lost only 50 per cent of its original intensity, while the two others suffered an average loss of 63 per cent.

It still remains to be shown that the same rule holds good for *all* red grapes; but it seems definitely proven that in the Zinfandel grape at least no permanent advantage is gained for color by fermenting at a high temperature, unless some means were found to prevent the loss occurring under ordinary treatment.

A very striking point is shown in the case of the two wines in the preparation of which no stirring was practiced, and in which, therefore,

we may assume that only the most interior portion of the color-bearing layers was extracted at all. Here we have in the case of No. 558, with an original intensity of 30, a decrease to 7.4, or nearly 75 per cent loss. In No. 559, although the original intensity was less—27.8—the color has remained at a better figure—9.0—doubtless for the reason that the higher temperature produced in the thick pomace mass caused the more permanent pigments of the exterior layers to be partially extracted. This is also indicated by the tints observed, which in the latter sample lie nearer the purples than in the former.

It thus again appears that in the case of Zinfandel wines *not* subjected to *fouillage* or its equivalent during fermentation, not only is the color extracted less as a whole, but is also of a less permanent character, and lies toward the "reds" of Burgundies rather than the "purple-red" tints of the Bordeaux wines.

Glancing at the column of intensities observed on April 8th, it appears that the maximum of color has been preserved by the sample fermented according to the usual practice of the viticultural laboratory, viz.: No. 561, which stands 2.6 points above the highest sample made according to any other method. This sample has also preserved more nearly the purple-red Bordeaux tint than any other; those fermented without any cover (Nos. 557 and 560) having on the contrary gone decidedly farther toward the reds. That this is the tendency of all these samples is obvious from an inspection of the table of tints; and it is in accord with what is known of *all* red wines, and will be amply apparent from a tabular statement of our observations upon a large number of wines, soon to be published.

It should be remembered that, as stated in a former bulletin, the French color-scale runs from simple "purple-red" through five numbered shades toward "red," and from this again through progressively numbered shades of red to orange, the final stage being the brownish-red color of old port wines.

E. W. HILGARD.

Berkeley, April 15, 1887.